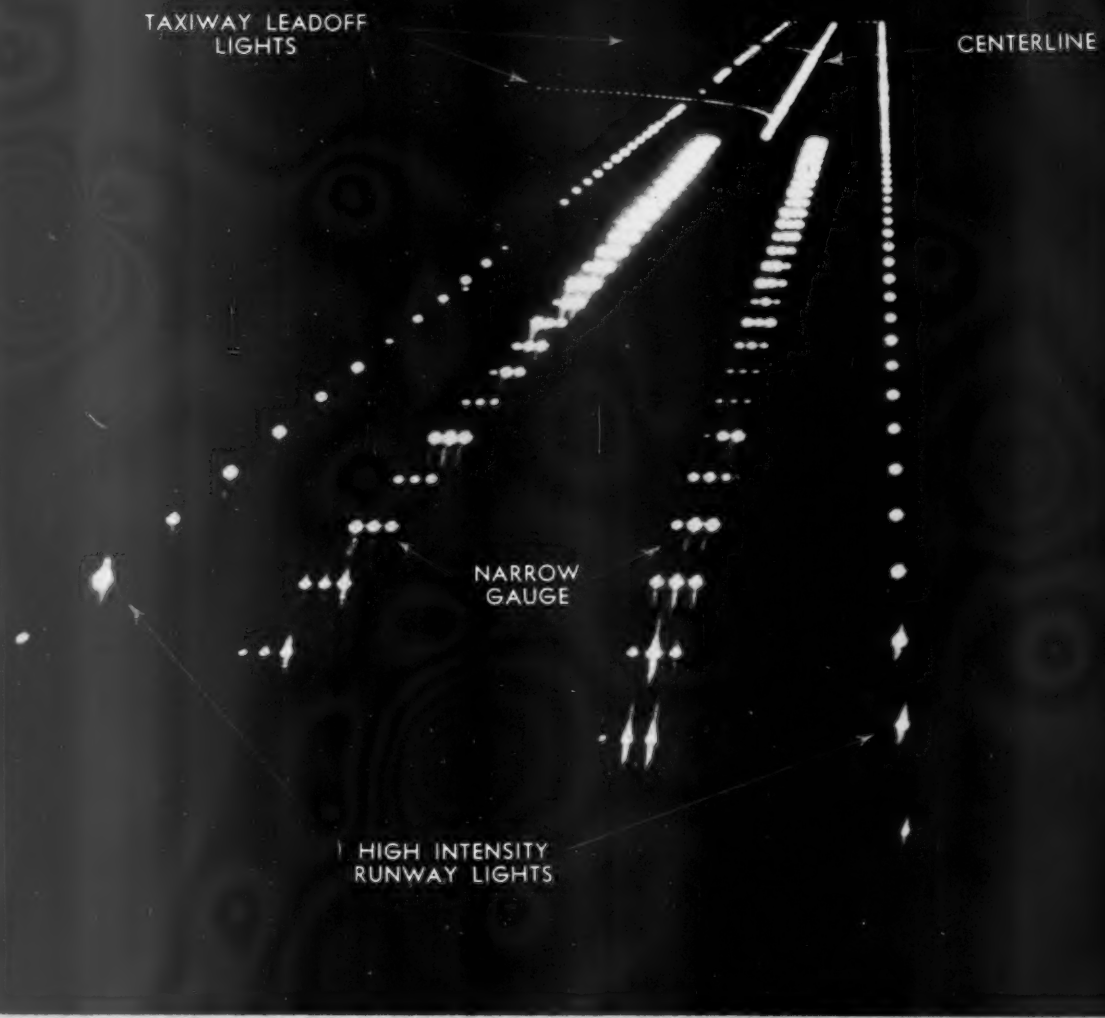
OCTOBER, 1960

THE AIR LINE PILOT

In This Issue:

- Are Terminal Areas Adequate?
- Internal Parasites
- Air Transportation—A 1960 Perspective



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THE AIR LINE PILOT

OCTOBER, 1960

Vol. 29, No. 10

EDITOR ..... Ed Modes

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ADVERTISING & CIRCULATION..... Dolores Swing

Entered as Second Class Matter at the Post Office at Chicago, Ill.

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Published Monthly by the Air Line Pilots Association, International, Affiliated with A. F. of L.-C.I.O. Publication offices: 55th Street and Cicero Avenue, Chicago 38, Illinois.

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Annual Subscription, $2.50.

LABOR PRESS AFL-CIO

On The Cover

THE cover of this issue shows the narrow gauge centerline lighting system as it looks to a pilot during his approach to Idlewild Airport.

Installation of landing aids such as the narrow gauge system are of vital necessity for safe, and efficient operation of aircraft. Today there is wide controversy on the question of whether terminal area facilities are adequate.

Beginning on Page 4 is a comprehensive analysis of the problem from a pilot's view. The author, Captain J. D. Smith, Capital Airlines, calls on all segments of industry, government and the pilot group to pull together in a united effort to maintain adequate functioning airports equipped with all the facilities necessary to cope with ever increasing aircraft traffic.

The most critical phase of flight is the approach and landing and the old axiom "You can't hit what you can't see" is especially true when it pertains to airports without adequate lighting systems.

The Narrow Gauge lighting system has been subjected to an intense series of tests over the past few years. Results of that testing have established the system as a primary visual guide for safe landings at the lowest possible minimums. (Sometimes as low as zero-zero visibility.)

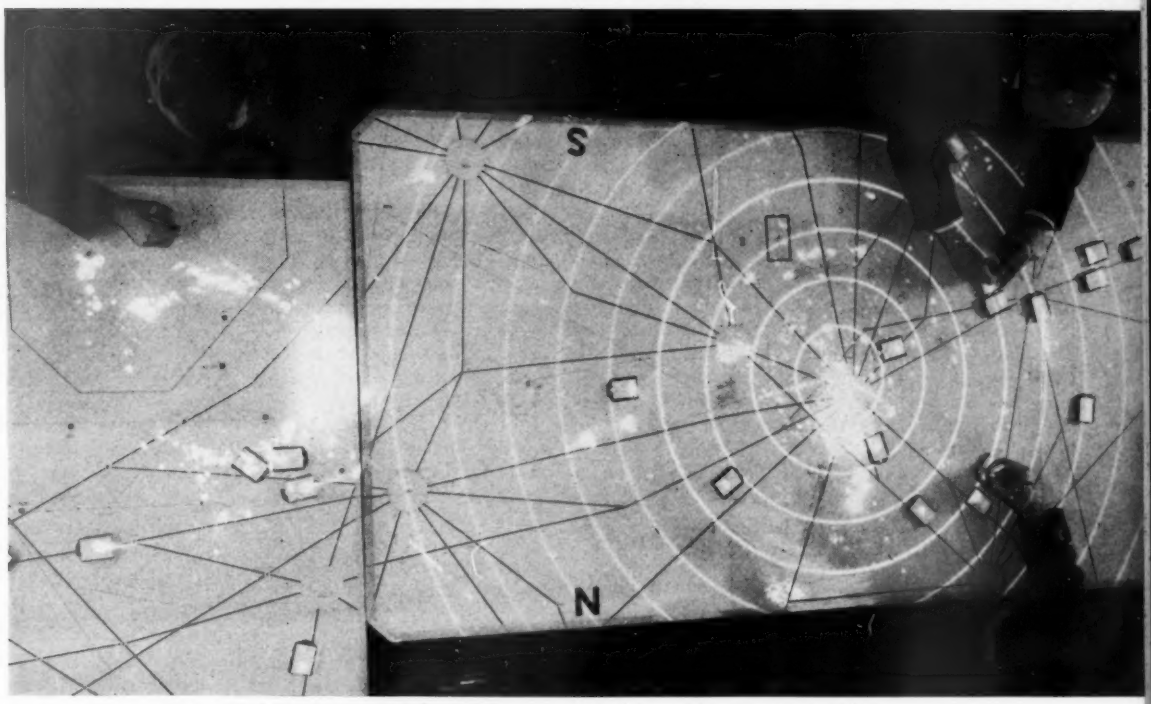
Initial tests were conducted at Dow Air Force Base. Under all conditions, and with all types of equipment, the Air Force completed 1248 successful landings in six months. Pilot comments: The system enhanced pilot ability by instilling confidence. Later tests were conducted at the FAA's NAFEC center and at La Guardia airport.

The narrow gauge lighting system is only one of the visual aids needed at today's airports to insure safe landings during night operations and when poor visability conditions exist.

Are Terminal Area Facilities Adequate?

THE ASSOCIATION over many years has advocated that air traffic control must stretch from the ramp of departure to the ramp of arrival. The basis for this position is the recognition that a safe and expeditious traffic flow can only be maintained by making available proper equipment, procedures, techniques and design to be applied to the entire time an aircraft is moving, either in the air or on the ground. There is little doubt that the terminal area regime of today provides the greatest exposure to accidents or incidents. Continuation of current deficiencies, while at the same time introducing larger and higher performance aircraft into the system will obviously increase the exposure problem unless proper corrective action is taken.

It is appreciated that a substantial effort designed to improve airspace usage has been undertaken; however, it is questionable whether sufficient attention is being given to improving overall terminal area operations. For the most part, a terminal area is considered as a circle around an airport having a radius of approximately 50 miles. The size would vary on the location and density of traffic and, in some cases, is considerably larger. While a great deal of material could be reviewed relating to an entire terminal area, the purpose of this Report is to primarily discuss airport capability. It is interesting to note that current airspace usage evaluation is an attempt to develop an ATC system capable of moving a hundred and twenty aircraft an hour through



Air traffic control must be expanded to embrace the total operation of aircraft from the ramp of departure to the ramp of arrival.

By Capt. J. D. Smith
Chairman, ALPA Air Traffic Control Committee

an airport. It is discouraging to note that nowhere is there an over-all project designed to develop an airport with such a capacity. Many of the current operational features of an airport are the result of attempting to keep up with current increases of traffic, and to date, only one specific airport proposal has been observed which conceivably will eventually have a capacity of one hundred and twenty movements per hour.

At one airport in the United States where more than three hundred million dollars has already been invested, an evaluation of a recent "Black Friday" was undertaken. At this so-called modern airport, it was determined the rate of movement was approximately 38 aircraft per hour. Obviously, such a traffic flow is unacceptable. While this evaluation did reveal some areas requiring improved ATC procedures, it was determined the prime cause for such an inefficient traffic flow concerned deficiencies within the airport itself. It was further determined that even though the state of the art was substantially improved, it is possible to assume potential maximum hourly movements will only be 60 per hour. At least, to some degree, many of these basic airport deficiencies apply to a large number of current Hub areas.

If aviation is to be permitted to expand as rapidly as possible, it can only be concluded that appropriate corrective action must be directed to increasing airport capacity. As antiquated as our current ATC system may be, we still do not have an airport in this country which can match the capacity of this ATC system on a sustained basis. Inasmuch as the current criteria for the future ATC system calls for 120 movements per hour, it must follow that a program be undertaken which

Alert Government, Industry, Programs Plus The Operational Knowledge Of Pilots Must Be Pooled To Insure That Terminal Area Facilities Keep Up With The Increasing Flow Of Airport Traffic.

will determine the required operational features airports must possess in order to efficiently participate in such a system. In my view, FAA should immediately undertake a program having as a purpose the requirement to develop a complete airport system which has the capability of matching the ATC system. Such program would establish criteria for runway arrangements, taxiways, by-pass areas, ramp arrival and departure routes, etc. It also appears appropriate to evaluate some current airport conditions and determine problem areas which adversely affect efficient traffic flow.

Information Needed

In many areas, airport operators have attempted to obtain required information in order to intelligently program airport improvement. Unfortunately, effective leadership in this regard has not been available until after the problem is experienced and then it is too late. In all fairness to some airport operators, I can recall in years prior to implementation of commercial turbo-jet operations, their requesting needed information to plan efficient and adequate runway systems. Many of the answers provided them were at least naive, if not deceitful. I can vividly recall being chastised by a Congressional Committee because of strongly stating well prior to introduction of commercial jet operations that 8,400 and 10,000 foot runways would not be sufficient. At that time, the Congressional feeling was the result of previous testimony from so-called experts. An example of difficulties experienced in properly highlighting commercial turbo-jet operational requirements can be gained from recognizing that only within recent weeks has ICAO released airport material for these newer aircraft. This much-needed document unfortunately comes a few years too late.

The rapid increase of traffic movements at many of our larger Hub areas by civil users, as well as the air lines, makes it mandatory that FAA accept our long-standing position calling for air traffic control to embrace the operation from the ramp of departure to the ramp of arrival. Once such an urgent requirement has been accepted by FAA, it should then be possible to have an effective leadership capable of bringing about adequate airport design capability which will match that of the airspace usage system. If this matching capacity is not obtained, there is every reason to believe the tremendous sums of money and effort invested in improved airspace usage will result in failure due to terminal area deficiencies. Such a failure would indeed be a catastrophic blow to the further expansion of civil aviation.

It is of little advantage to establish standards unless it is also possible to accomplish implementation. In too many cases, "Technical Standard Orders" are accepted as recommendations rather than requirements. An attempt to overcome this situation has been the requiring of blanket components in order to implement the runway visual range weather reporting program which results in providing a community better service when weather conditions permit. As technical standard orders are designed to improve operations, it follows that every effort should be directed towards their becoming available for actual use. In those instances where technical standard orders apply to off-airport areas, it is necessary to develop a criteria ensuring appropriate sites will be made available for the installation of the required units. In this regard many communities have been woefully lax in providing proper planning designed to assure maximum advantage would be obtained from the airport investment. The problem of inadequate off-airport planning becomes even more severe as residential dwellings are permitted to move closer to the ends of the runway.

Airport Certification

In some quarters, the term "Airport Certification" is considered a dirty term. However, the lack of such a process has substantially contributed to numerous current deficiencies. It is believed that airport certification when properly established would be beneficial to both the user, the airport operator and the community. Such a procedure would call for satisfying minimum standards and, when properly developed, could provide the basis to overcome many existing deficiencies which all agree should be eliminated. The airport certification could provide a proper basis for justifying required correction and bring about an equitable means for maintaining the highest level of safety. The airport operator would benefit because of being able to state his facility did meet current standards and therefore his liability requirements have been satisfied.

It is not believed one set of standards could be currently applied across the board; however, an equitable arrangement could initially be obtained by categorizing the facilities according to volumes of traffic. In many cases, this is being done and with airport certification, the airport operator would find new, sound supporting material, justifying the demands he may be making on a community. The aircraft, the pilot, the government facilities are all currently certificated and sooner or later, the advantages of airport certification will be appreciated. It would appear desirable, at least at this time, to establish an effort with airport people to explore the program of airport certification, and determine its application.

In many areas sound procedures currently exist for various airport operators to properly maintain their facilities. In some cases, however, aircraft have been substantially damaged because construction, snow removal, or other current projects within an airport are not properly announced. These unnecessary accidents have been the basis for carriers improving liaison with airport facilities in order to ensure remaining abreast of all current airport conditions. Obviously, we strongly support such a close liaison. For the most part, airport operators are usually anxious to properly maintain a facility. Direct communication with the airport operator at the outset normally results in appropriate corrective action. The advantage of a close relationship between the user and the airport operator is obvious, and I trust this effective procedure can be expanded through all facilities we utilize.

Industry Coordination

To some extent, the lack of industry coordination on airport matters is a basic contributing factor to many of our current deficiencies. There are too few airport operators who openly solicit the thoughts of the pilot group. Inasmuch as the pilot group does not participate in the financial obligations related to airport improvement, many organizations consider this a valid reason for not soliciting pilot thinking. Financially speaking, this assumption may be valid; however, such is not true from an operational standpoint. In many cases, inadequate planning has so diluted the capacity of the airport, it has been necessary to curtail service to communities, which certainly has an adverse effect on many.

We can appreciate the advantage of having impressive terminal buildings; however, it must be borne in mind that maximum advantage of an airport facility can only be accomplished by providing the most efficient airport configuration. In many short-haul areas, the lack of efficient taxiway design clearly curtails expansion of commercial operations. In 1959, the ground time for an entire fleet of aircraft in short-haul operations was 30 per cent. A substantial part of this was due to airport deficiencies. Many of these undesirable deficiencies can easily be eliminated if the proper atmosphere for jointly pursuing the problem is developed.

Our records indicate the greatest accident/incident exposure rate is in the terminal area, and therefore an urgent need exists to establish a well-coordinated program designed to obtain maximum safety and efficiency at our current airports. If commercial aviation is to realize an all-weather operation, such an accomplishment will only result from a well-coordinated industry effort. In order to reach this goal, it is fundamental that the solution be pursued by appropriate government/industry representatives vitally concerned with this matter. In addition to an all-weather operation, there is an urgent need to improve current airport flexibility and permit maximum expansion of civil aviation. If such an effort is not undertaken, one cannot help but conclude that the airport will continue to enjoy the undesirable position as being the prime obstacle in the path of expanded aviation progress.

Promoting Financial Arrangements

There is little doubt but what adequate financing for an airport is oftentimes a difficult problem. In many areas, rapid expansion of the size of communities has brought many other problems such as schools, hospitals, road construction, etc. The inconsistencies of Federal participation in the matching funds program also antagonize the ability of having a community further invest in airport expansion.

Obviously, there are many advantages to an airport. It is highly desirable to document such information for distribution to appropriate organizations and individuals. This has been done in some areas with considerable success. It is recognized, however, that adequate financial planning must be done over a period of years, and this highlights the importance of a consistent position on the part of the government as concerns the Federal Airport Aid Program. Even now, this indefinite position on the part of the government is extremely undesirable, and it places communities in the position of assuming it may be necessary to raise twice the original investment should the Federal Airport Aid Program not be reinstituted or continued. In some communities, this presents an unsurmountable financial program to the airport operator.

It is mandatory that the aviation industry undertake a coordinated program to ensure continuation of the Federal Airport Aid concept. It is my belief a proper presentation can adequately convince Congress that this Federal Airport Aid Program is not merely a give-away advantage to the air line industry. This Federal participation is merely an investment which will be returned many times over by providing a more effective way to further improve business dealings and many other factors which cause additional monies to be returned to the Government.

One of the prime criticisms directed to the industry concerning Federal Airport Aid was the substantial amount of unused funds which had not been requested by various states. In effect, this philosophy indicated that because a few did not take advantage of this Federal aid, it then appeared appropriate to eliminate it for everyone. Such a conclusion is extremely unsound. It is believed there is merit to amending the Federal Airport Aid Program in the event allocated funds are not used after a two-year period to have such funds placed in a discretionary allotment for use in areas where it is needed. It is appreciated that this poses some difficult political problems; however, the industry must effectively point out that the airport system is a nation-wide program and cannot necessarily be divided on a state basis. Oftentimes, airport improvement at one location will provide benefits for those in another state. The Association, on many occasions, has attempted to justify the need for adequate airport planning and improvement, and there is little doubt but what we would continue such a program in assisting airport operators in their planning.

If the Federal Airport Aid Program is not continued, I foresee extremely grave difficulties for many communities being able to provide proper facilities for our use. Such a decline will obviously adversely affect safety of operations. This position can be appreciated by realizing that substantially increasing operations adds to the expense rate and in the not too distant future, the rate of accidents/incidents will become unacceptable to the traveling public.

In addition to safety of operations, one must also consider the economic penalties experienced by the user. The unnecessary ground time due to current airport deficiencies creates a serious economic penalty on the carriers. This substantial unnecessary cost of operations adversely affects their rate of return, and makes it more difficult, if indeed not impossible, to undertake financial commitments for additional airport improvements. At one airport today, average ground times on an air line operating turbo-jet aircraft for departures is 27 minutes. A great majority of this financial penalty is due to airport deficiencies. Of course, this cost is in addition to others connected with use of the airport.

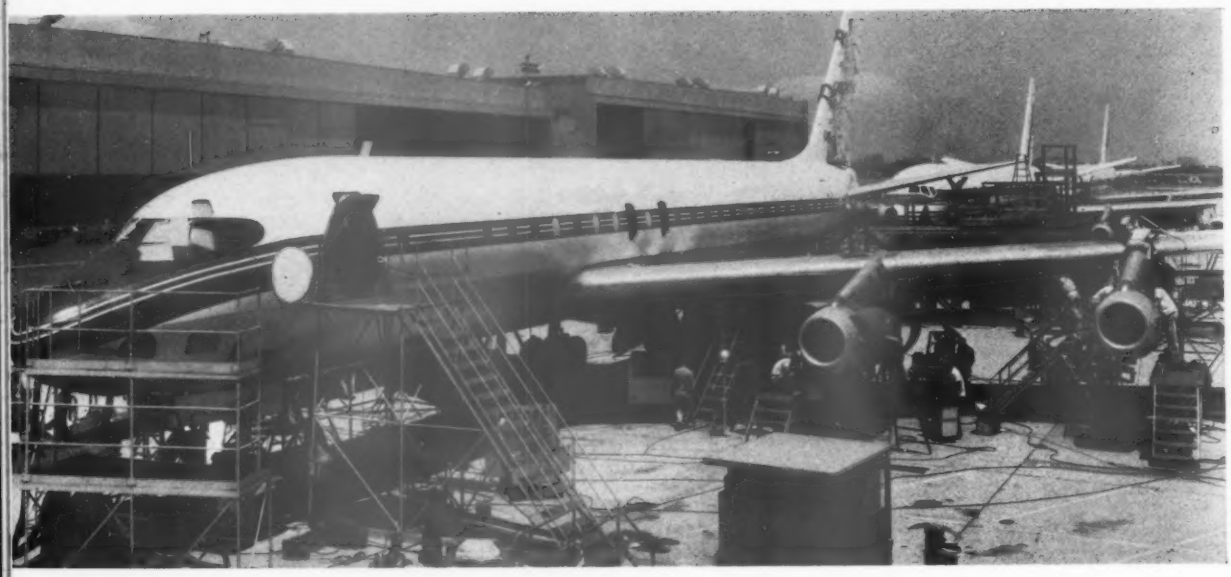
Summary

One can summarize this subject by stating we need (1) a procedure to properly determine what is needed; (2) how the facilities are implemented; (3) and how they shall be paid for. Unfortunately, there are no answers to any of the three points.

It must be borne in mind that a substantial increase in over-all aircraft movements will occur. It now becomes necessary to view the airport improvement program on a package basis, directing particular emphasis towards implementing proven advantages.

It is not possible to only view further airport development at the busier locations. Practically every domestic air line engages in some phase of the so-called short-haul type operations. This phase of our operation is in dire need of a program designed to equip these airports with facilities which permit operations at the lowest possible weather minimums. The lack of such facilities deny air transportation to thousands of air travelers annually. Ironically these inconveniences and financial penalty to the industry oftentimes occur because cancellations or diversions take place during flyable weather. While such cancellations or diversions may be credited to weather, the actual cause should be listed as insufficient facilities.

Aviation has made substantial studies over the years because of coordinated efforts. An adequate airport system in this country is a challenge to everyone. Hopefully, this vast reservoir of knowledge will be pooled and a well-coordinated program will be established to achieve an ability to permit operations at all locations at the lowest possible operating weather minimums.



Airplanes and Internal Parasites

By Capt. C. C. Jackson
Executive Secretary, IFALPA
From The Manchester Guardian

AS I GAVE my thoughts one morning to current trends in aircraft development, as seen from the pilot's viewpoint, my 18-year-old daughter was setting out for school to take her biology examination. I asked her if she could think of a laminar flow fish which carried in it a crowd of benevolent internal parasites essential to its movement and survival.

This question, however, had not been covered in her syllabus, so she undertook to carry out a little research in the school library. Meanwhile I put down my own thoughts on parasites without making the single cross-check I had intended—a true pilot's approach to a problem which might well baffle a modern design team. My excuse for doing so is that the modern design team is so busy cross-checking that its own thoughts remain entirely unexpressed as far as the public is concerned.

The main impression I have of the present generation of aircraft is that they are at or near the epitome of post-war design philosophy and have run into a region of difficulty, especially in the matter of aerodynamic stability, structural strength, and performance. What is wanted of the airframe is a fundamental transformation comparable with the transformation from the piston to the jet engine. Yet no such transformation (area rule regardless) seems on the horizon and, in order to make the minimum advance which competition demands, manufacturers are increasingly being driven to find expedient solutions in the field of instrumentation rather than fundamental solutions in the field of pure design. Different manufacturers, of course, run up against different problems and therefore no aeroplane carries all the gadgets I propose to comment upon, though some of them carry most. Whether this tendency of "we-can't-do-much-about-that: let's-fit-an-instrument" can be continued indefinitely would be very difficult for anyone to forecast; my own views are not settled and for want of guidance from the designers themselves I may as well make up my mind on the basis of my daughter's reply about the fish: if she can find a fish that thrives and progresses towards its Darwinian destinies mainly by reason of its parasites, then perhaps it would be permissible to expect airplanes to do the same.

To bring sharply into focus the type of problem I have in mind, let us consider the yaw-damper. As aircraft approach the speed of sound the boundary layer ceases to cling to the aerofoil, shock waves develop and give rise to a small amplitude fishtail effect at the rear; if allowed to develop, this will in turn induce a higher lift in the forward travelling swept wing and a lower one in the (relatively) rearward traveling wing, thus giving rise to roll—the yaw and the roll together accounting

for Dutch Roll. Now some designers have managed to keep the shock wave out of the way and have effectively avoided Dutch Roll in the normal operating range. Others have not felt able to devote much time to the problem and have simply fitted an auto-pilot device, the yaw-damper, to counter the initial yaw and so to avoid a build-up into roll.

We can, I think, safely class the yaw-damper as an undesirable parasite, and hope to see it designed out of the next generation of aircraft. However, this is by no means certain, since the main escape now in use involved keeping below the critical speed (that is, flying more slowly) and sooner or later in the advance to and beyond Mach 1 the shock wave must be encountered.

Also connected with the auto-pilot, but more respectable than the yaw-damper, is the automatic height lock Here we have a device which takes its signals from a sensitive altimeter and applies them to the elevator in order to maintain the desired flight level. When it is properly matched to present day subsonic aircraft, it can reduce the height-keeping error from 500 ft. to 50 ft., a tremendous advance and, indeed, an essential one if present vertical separation standards in the upper air (2,000 ft.) are to be justified. It will have its work cut out in the transsonic region (where life is suddenly lost) and one must not ignore the fact that fighter aircraft either do not or cannot use it. But I would definitely class it as a desirable parasite, and trust that it survives in its new environment.

The above two devices are connected with problems of stability: let us turn to structures. Here the problem is mainly to keep the wing from falling off, which at high speeds they may do if they develop undamped flutter, either directly because of variations between wind tunnel and free aerodynamic forces, or indirectly through a structure weakened in the spar or at the wing-root by abnormal loads, such as those occasioned by a heavy landing. These difficulties have led to the installation of a number of parasitic devices, and I propose to have a look at them before deciding whether they are benevolent or malevolent to the development of the species. One of the most attractive ways of keeping the wings on is to avoid the loadings occasioned by severe gusts. The device principally used for this is airborne radar, and this enables almost all the severe gusts associated with the cloud to be avoided. Fortunately too, the gusts not associated with cloud have been found (but only recently) on the average to have half the velocity of those found in a cumulo-nimbus cloud (30 against 60 ft. per sec.); so airborne radar is a most effective safeguard so long as it is serviceable. But the designer has perhaps placed too much reliance on the fact that with airborne radar, his airplane will not meet so many severe gusts thus, under tremendous pressure to chisel off redundant structure, it would seem that he has paid inadequate attention to the case of an unserviceable airborne radar, and recent history exhibits some wing failures when this device was not in use. In the United States it is being made mandatory for all pure jet aircraft, and many will carry dual equipment. Even so, I would like the structure to cope with a few 66 ft./sec. gusts and use the airborne radar to give the passengers a smooth ride, which is what it was primarily designed for.

In addition to the few severe gusts which the airplane must expect to meet in its lifetime, the designer has to provide for many moderate gusts. As all gusts contribute to metal fatigue, it is a question of how many can be tolerated and, this in turn, depends on how big the gusts are. The modern designer would, I think, tell you that if you insist on the structures being able to withstand an indefinite number of moderate gusts, you will have an airplane so heavy that it will carry no payload, or so slow that speeds over 340 knots will never be reached. He will go on to say that the traveling public has clearly rejected these limitations, and that the only answer is to count the gusts, classify them according to magnitude, and so arrange the modification and maintenance program that strength is always somewhat ahead of the life of the component.

Now I am not sure that the question of speed and payload versus structural integrity has ever been clearly put to the traveling public, or, on the other hand, that the traveling public wants it clearly put. It is one of those problems of our civilization, like the connection between drink and driving, on which, at least until now, we have preferred to be indeterminate. We have not, therefore, dissuaded the designer from building his structure on the basis of a limited fatigue life, and from fitting an accelerometer to count the size and frequency of the loads encountered. This he calls a gust recorder or, if combined, with recording facilities for other imputs (e.g. speed, altitude, heading) a flight recorder.

Another source of high loads is landing. There is a tendency for jet aircraft to land more heavily than piston-engined aircraft. It is worth noting in the structural field that attempts are being made to record the frequency and magnitude of landing loads just as they are of aerodynamic loads. This particular parasite is in use for testing but not yet for general operations. If the performance engineer does his work properly we ought never to need it.

I cannot help thinking that all these devices, if used to offset basic structural uncertainties represent a poor chapter in the progress of the species, and I can only hope that the overall strength demanded of supersonic flight in order to meet the shock wave and the heating problem will enable the gust-cum-metal fatigue heresy to be overcome by advances in the gospel of pure design. For example the use of steels instead of aluminum alloys should greatly add to strength and the increased weight may be offset against engine power. The reduction in wing span should also assist, though this may, of course, bring with it poor handling characteristics in the low speed regime.

I mentioned at the outset of this article that what was needed was a fundamental advance in the design of air-frame comparable with that made in the transition of the engine from the otto-cycle to the turbine. But prince of designers though the engineman may be, he too has his troubles and now and then seeks an easy escape by fitting an instrument. One of these is the vibration indicator. These can be designed to pick up the vibration at bearing housings and other vital points inside the engine and to give an indication of this in the cockpit. By this means they allow the engine to be shut down before eccentric rotation induces blade failure, or, conversly, before blade distortion induce bearing failure. Probably the chances of some inbalance in the turbine must always be allowed for, and, as the penalty of turbine failure is high, an early warning device would seem to be well justified. After all, the designer has since the war given us three times the thrust for two-thirds of the weight—no wonder there is the need for special precautions to prevent the tail from wagging the dog. We should therefore be prepared to live with vibration indicators at least until the pure ram-jet comes into use.

Turning now to performance, the great problem of the performance engineer is to reconcile the requirements of high-speed flight en route with low-speed flight for the approach and landing. So far, every advance in cruising

speed has (for economic reasons) been accompanied by only very small advances in runway lengths; the designer has, therefore, had to plan for comparatively small increases in approach and landing speeds and it is not surprising that he seeks relief by fitting instruments.

At take-off it is not difficult to meet the requirements to get the airplane into the air with all engines operating and if this were all that was needed, the performance engineer would be a happy man. But experience, sometimes bitter, has taught the industry that it must allow for the occasional engine failure on take-off and this has led to a great deal of difficulty. Probably the easiest way out is to fit an auxiliary rocket which can come into play to replace engine thrust immediately the latter is lost. Although rocket-assisted take-offs are used in a few air lines and among the military they are somewhat terrifying for passengers and, perhaps for this reason, do not seem to have caught on.

However, as the rockets are at present fitted as external parasites and I am endeavoring to keep mainly to the internal, I will remark only that I expect we have much more to see of them.

Another method by which the designer has sought to get the last ounce out of the take-off while keeping the runway length down, is by using take-off monitors. Here, for the first time, the instrument manufacturer has not at once supplied the complete answer. About a dozen types of monitors have recently been put forward, but I do not know of any being in regular use by the air lines. By the time one has fed into a black box successive approximations of speed, acceleration, runway friction for braking, and allowance for non-critical runway, one fetches up with an instrument with an accuracy little if any better than a pilot with a stopwatch and marker-board; in any event it does not account for the variables entering the scene after the decision point, which factors (time of rotation, speed of rotation, angle of rotation, and angle of attack during initial climb) contribute more to the variability of take-off distance and verticle clearance than do the factors applying earlier. I myself see an extension of the market-board system (which has the much neglected merit of simplicity) until such time as the latter group of parameters are satisfactorily instrumented by means of a "take-off director." At least one manufacturer is now claiming this, and we may therefore shortly see a sounder basis for ensuring adequate take-off margins. On the other hand we may instead see a move to cut back on these margins; but if this should be so, it would in my view be a deplorable step. Take-off today represents a subnormal standard of performance; if an instrument is invented to improve the accuracy of pilot technique and to guarantee a solid margin of safety, it will do no more than restore the position to what it was ten years ago. In any event no fundamental advance in design is to be associated with take-off monitors or take-off directors.

At landing the designer has been equally hard put to it. The certification procedures generally in force for jets are based essentially upon the speeds and techniques used for piston-engined aircraft. Yet compared with the propeller-driven airplane, the jet carries no slip-stream buoyancy; owing to residual thrust and clear aerodynamic design, it floats farther for a given excess of airspeed at the threshold; it has less reverse thrust; and, touching down at higher speeds, its breaking action is initially less. So fundamental are these differences that the designer has so far been largely unsuccessful in finding an instrument to offset them, and has had to fall back on asking the pilot to refine his techniques. This the pilot has done as far as possible but, in avoiding the tendency of the aircraft to overshoot, is it surprising that he sometimes errs in the other direction and undershoots or makes a hard landing?

These, indeed, represent by far the greatest causes of incidents, and I regard the tendency as so important that I will expand upon it a little further. At the new office of the British Airline Pilots' Association is a picture window which gives an excellent view of the approach to London Airport runway 28R from a distance of about one and a half miles. On this window was etched the mean approach path of VFR traffic. All the piston-engined and turboprop aircraft came most faithfully down the line. The jets, however, almost invariably dipped below at about 300 feet, then slowly climbed back on to the glide path so that they crossed the threshold at the same height as the rest. A full explanation of this technique has not, as far as I know, been given. It would seem, however, to indicate a habit of dissipating some of the speed margin by means of the attainment of a high nose-up attitude from a point just before the threshold.

But if the speed margin is in the first place small (and, lacking slip stream buoyancy, it is certainly smaller than with the propellor-driven types) sometimes it will be dissipated too soon. Hence the undershoot and the heavy landing; and hence too some of the weakened wing structures, nose and main gear failures which trouble the manufacturer, operator, and certificating authority. Automatic flare-out devices, more accurate airspeed indicators improving the display of both the latter so that the pilot can assess speed while still maintaining his forward view outside the aircraft instruments, cockpit indication of a wheel skid—all will help, but in my view the best safeguard in this area is an adequate speed margin. This means more concrete at the end of the landing run. But even folk who half agree with me in not relying on improved pilot techniques or better instruments to solve the overshoot problem have turned to gadgets for a solution, though this time external ones. One manufacturer has fitted a tail parachute, and the FAA has set aside a large sum for research on the development of arrester gear suitable to take the momentum of a modern transport aircraft. On the undershoot side of the problem again external devices are being generally favored—in particular, approach lighting and angle of glide indicators. Far be it from me to decry these excellent aids but they are not the true answer to the problem. For this nothing short of a reduction of the stalling speed or the direct development of lift from thrust would seem to follow the true lineage of design.

At this point my daughter returned from school to say there were no fish. laminar flow or otherwise, which developed along their selective ways with the aid of benevolent parasites. She said the most biological advance was a result of an increase in the size of the brain which enables the creature to exercise positive power over its environment; compared with this power the effect of parasites was negligible. To make the most of this advice, I would say, therefore, that the secret of the immediate future for aviation lies in the development of the source of power. With new power—weight ratios aerodynamic design will tend to repurify itself, and probably all that will remain of the above internal parasites are airborne radar and height-locks. These, however, will survive in their own right as navigational aids and not as "instrumental" solutions to what are really problems of design.

Swept-Wing Takeoff Techniques

By A. P. Wilson, Flight Captain

Engineering-Production Flight Dept.
Convair Division of General Dynamics

TAKEOFF TECHNIQUES with the new swept-wing jet transports can often be improved by a better understanding of three considerations: takeoff abort at V_1, rotation, and noise abatement climb-outs.

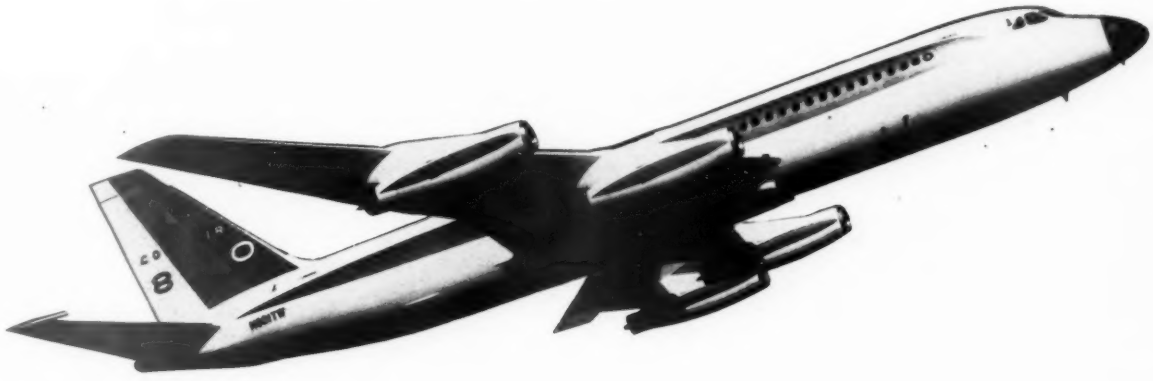
Perhaps a thorough discussion of the takeoff maneuver will clear the hanger-flying atmosphere and encourage some pilots to shed their misunderstandings and misinterpretations that can build up unnecessary problems, which in turn can lead to difficult moments. Fundamentally, this reduces itself to knowing your airplane and what it will really do.

Specifically, consider the takeoff of the Convair 880; with minor variations, the principles should apply to other swept-wing jet transports.

In executing a proper takeoff in the Convair 880, the following procedure is recommended. When the aircraft is aligned on the runway and the pilot is satisfied with his engine indications, brakes can be released. The pilot should steer, using his left hand on the nose wheel steering control wheel, his right hand on the power levers, ready to abort the takeoff in case of necessity. The copilot should maintain a light forward pressure on the control column, using slight lateral control if required to keep the wings level.

If there is a cross-wind, excessive use of lateral control should be avoided, since extension of spoilers to decrease lift on the up-wind wing also creates drag and yaw on that side, thus increasing tendency to weather-cock into the wind. At the same time, the copilot should monitor the engine instruments and air-speed. At approximately 70 to 80 KIAS, the rudder becomes quite effective in maintaining direction while the nose wheel steering becomes less and less useful.

Above these speeds, the nose wheel (because it is lightly loaded) has little capacity to overcome the inertia of such a mass and change its direction; a futile scrubbing of the nose wheel tires is the usual result. At this point the pilot can release the nose wheel steering and hold the control wheel with his left hand, still keeping his right hand on the power levers. Light forward pressure on the column should be held to keep some weight on the nose wheel; although steering is not too effective, there is some directional stabilization, which would be of con-



siderable help in maintaining direction if an engine should fail. With the stabilizer set properly for a given CG, the nose has a tendency to lighten, sometimes allowing the nose wheel to lift off sooner than desired. As airspeed increases, the elevators tend to align themselves with the stabilizer; this tendency must be overcome by a slight additional forward pressure.

The Convair 880 sits almost level longitudinally and should be kept in this attitude until V_r is attained rather than pushing the nose down excessively; such a procedure helps to reduce aerodynamic and tire drag, resulting in a shorter acceleration time and less distance to takeoff speed. Conversely, raising the nose high prematurely increases aerodynamic drag and, as a result, takeoff distance.

Setting Facts Straight

Many pilots are convinced that they would be unable to stop on the remaining runway if a takeoff were aborted at V_1. This misapprehension is to a considerable extent unwarranted; the stopping capabilities of most aircraft are far greater than many pilots believe. A few rejected takeoffs during training would serve to illustrate graphically this fact to pilots, relieving them of much apprehension. Establishment of V_1 is the result of extensive calculations and actual accelerate-stop tests in the aircraft; the resultant numbers are presented in the Flight Manual. Convair 880 V_1's were established with due consideration for time and distance to accelerate to V_1 with four engines, a two-second delay after engine failure before power reduction on the remaining engines, and time and distance to decelerate to a stop with the use of maximum braking but **no** reverse. Reverse of the remaining engine on the one side and its counterpart on the other side is an additional safety margin in the pilot's favor. Since V_1 cannot be less than Vmcg, this means that the takeoff should be aborted if an engine is lost before attaining a speed at which the direction can be controlled by aerodynamic controls alone. This, in some cases, results in a V_1 greater than a simple accelerate-stop V_1 and increases the required runway for their weight (usually a comparatively light condition).

When flying from a minimum length runway, V_1, is applicable. If the available runway is greater than minimum, however, V_1 can be increased to accelerate-stop speed on that runway but may not exceed V_r for the aircraft weight. The aircraft could be accelerated to a greater speed and yet be stopped, depending on the runway available in excess of the minimum. Determination of V_1 also involves consideration of the time and distance that would be required to (1) accelerate to V_1 (2) lose an engine (3) accelerate to V_r, and (4) lift-off and attain V_2 at the 35-foot obstacle. Accelerate-stop considerations, however, seem to cause pilots more concern than accelerate takeoff; they should be assured that every consideration has been given to safety as well as to performance.

Next is V_r. We have used a V_r for many years although it did not enjoy the distinction of a name until recently. We have, in the past, applied back pressure on the column at V_2 minus some value (6 to 8 knots on Convair 440's) which would result in a lift-off at V_2. Today, to avoid raising the nose too soon or too late, we begin rotation at a V_r which causes the aircraft to lift off at a speed resulting in V_2.

As presented in the manual, V_r has several safety margins incorporated for the pilot's protection. It can not be less than V_1 and, therefore, not less than Vmc. The V_r must be the highest of the following minimum speeds.

- The V_1 speed
- 1.05 Vmca
- A speed which permits attainment of V_2 prior to reaching a height of 35 feet above the runway.
- A speed which, if the airplane is rotated at its maximum practicable rate, will result in a lift-off speed, V_1 of not less than 1.10 Vmu4 or 1.05 Vmu3.

Note: Vmu 4=Four engine minimum unstick speed
Vmu3 = Three engine minimum unstick speed

It, like V_1, is intended for use on minimum distance runways; if a longer runway is available and obstacles on the climb path permit, a longer takeoff run (resulting from late rotation or other causes) can be afforded. Nevertheless, in the interest of accurate flying and to provide for the times when takeoffs are made on minimum runways, pilots should form the habit of proper rotation at V_r.

By proper rotation, contrary to some pilots' interpretation, is NOT meant a rough, minimum time, snatching application of elevator to assume an attitude which could result in early lift-off. Some pilots rotate so abruptly that the aircraft's load factor is increased to a degree that buffet is encountered even though the speed may be above the buffet point for a 1-g condition. An undesirable side-effect of such a technique stems from the characteristic tendency of swept-wing, when disturbed by gusts or later over-control, toward lateral oscillations at or near the buffet point. (This tendency is also present in straight wings but usually to a lesser degree.) The oscillation can easily be aggravated by a pilot's excessive, out-of-phase lateral control applications. The smaller the lateral control inputs to make the necessary conditions, the better. Excessive lateral control at lift-off may cause the aircraft to bank as soon as the wheels clear the ground; care should be exercised to avoid unnecessary lateral inputs as the column is pulled back. Considerable self-discipline on this point is at first required by pilots who have been used to flying less responsive straight wing aircraft. Roughness and/or abruptness in flying have always been considered poor techniques and become ever more so in present-day fast aircraft.

Takeoff Procedure

As V_r, usually slightly above V_1, is reached in the Convair 880, a smooth but firm application of up-elevator pressure should be applied, causing rotation of the aircraft to about 7 to 10 degrees nose-up attitude by reference to the actual and/or the artificial horizon. At this angle of attack, the aircraft should become airborne, while accelerating, at a speed about half way between V_r and V_2. In this way, V_2 will be attained by the imaginary 35-foot obstacle. Normally, the attitude should be held, or at most, increased slightly to 10 or 11 degrees nose-up as speed **and** altitude increase. As an elevation of 400 feet above field elevation is reached, the speed should have increased to at least $V_2 + 30$ knots, at which point the flaps may be retracted, then the nose is gently lowered to 4 or 5 degrees above the horizon and the speed allowed to increase (while climbing) to that speed required for en route climb.

If an engine should fail at V_1 or slightly after, the same pitch control procedure is followed, except that holding the 7 to 10 degrees nose-up attitude usually will result in climb at V_2. Here, it is better to hold the same attitude at V_2 or slightly more, rather than attempting to chase the airspeed. If it is desired to climb at exactly V_2 in order to realize the angle of climb quoted in the manual, raise (or lower) the nose to a degree or two and hold it, giving the airspeed sufficient time to change and stabilize before making any further pitch corrections. Failure to control attitude properly and chasing airspeed by making large pitch corrections are

common mistakes which result in decreased climb performances because of changing g-loads and drag, due to excessive control surface deflections and/or increased flatplate area.

Direction should be controlled by rudder and by lifting of the dead engine wing about 5 degrees. The 5 degrees bank away from the inoperative engine helps achieve a lower Vmc. At close to Vmc, full rudder must be used; as speed increases, less rudder will be required to maintain direction. The aircraft can be trimmed as desired, the minimum necessary being that desired.

In the main, **rudder** must be used to maintain direction, keeping the slip to a maximum of 5 degrees. If slip is allowed to increase to about 16 degrees, the added lift on the lower wing and the decreased lift on the upper wing produce a rolling movement that is sufficient to offset maximum lateral control; at 15° slip condition the rudder, due to increased air load, folds back to a point where it is streamlined with the fin. At 17° to 18° slip, the vertical stabilizer is subject to stall and directional control is lost. With asymmetric power, a turning movement exists, the turning force as the rudder streamlines or the fin stalls is no longer held in check and the aircraft turns into the dead engine. Any yawing into these static limits will, proportionate to the yaw rate, aggravate the condition.

The forward moving wing, due to its higher speed, and increased effective angle of attack, generates more lift, the backward moving (relatively speaking) wing generates less lift, and these differences (combined with the differences in life due to the slip) cause the aircraft to roll rapidly. **At low altitudes, it may be impossible to recover from such a condition; therefore, it is wise to maintain a considerable margin away from this degree of slip.** By holding a maximum of 5 degrees slip, such a margin is ensured. This trait is characteristic of swept-wing aircraft, and it is essential to be careful not to expose one's self to such a hazard.

Takeoff With An Engine Out

Climb under an engine-out condition should be continued at or about V_2 until 1,500 feet altitude is reached (or until any immediate obstructions are cleared if it is desired to circle and land), at which time the nose may be lowered 2 or 3 degrees and held there, allowing the speed to increase to $V_2 \pm 10$ knots before raising flaps 10 degrees, then raising nose slightly, allowing speed again to stabilize. This maneuver should be repeated until flaps are retracted. Speed should then be allowed to increase, while climbing, to speed for engine-out best angle of climb, and this latter should be maintained until minimum en route altitude is reached. Speed should then be increased 50 knots to best rate of climb value. These speeds are given in the flight and training manuals.

If an immediate landing is to be made, flaps need not be retracted, but (on the downwind leg) extended to approach.

Engine limitations meanwhile should be observed and should not be exceeded unless an extreme emergency so demands. Jet engine emergency procedures are simple and can be postponed until the critical situation has been ameliorated. This allows the pilot to devote his attention to the all-important task of flying the aircraft; it should always be done smoothly and with the least efforts necessary. "Haste makes waste" can be very applicable in such a predicament.

If a noise abatement climb-out is necessary, the same take-off procedure should be followed, except that after the aircraft lifts off with the nose 8 to 10 degrees high and begins to climb **and** accelerate, the nose can be raised smoothly and gently to an angle of 11 to 17 degrees above horizon and **held there.** This attitude (about 11 degrees with a heavy aircraft, about 17 degrees with a light one) should be maintained until the speed stabilizes before making any further pitch changes. Eleven to 12 degrees nose up will result in approximately $V_2 + 10$ with a heavy aircraft; 16 to 17 degrees will result in approximately $V_2 + 20$ with a light aircraft. If there is any question of the wisdom or necessity for further speed adjustments, the attitude should be maintained or a pitch change of only a degree or two should be made and **held,** allowing the speed to change. Don't chase air-speed; hold the attitude.

It is better to climb at $V_2 + 20$ or 30 knots than it is to get into an extremely nose high attitude and perhaps allow the speed to drop to a dangerous level. The climb can be continued until the desired altitude is reached, then the nose lowered gently to an angle of 8 to 12 degrees above the horizon; as speed increases, flaps should be retracted, then, while climbing, pitch attitude should be further adjusted smoothly to allow acceleration to en route climb speed. Again, engine limitations should be observed. If an engine should fail with the aircraft in a nose high attitude, lower the nose gently and follow the engine-out climb procedure.

Although a small error from the rapid acceleration creeps into an artificial horizon during the takeoff roll, it is not necessary for the pilot to make particular allowances for it. He should, with experience, determine the proper pitch values for varying takeoffs and apply such values accordingly; the acceleration error will, in time, be eliminated after takeoff as the aircraft configuration is changed and speed is increased to en route climb. At all events, it is the only instrument which **immediately** indicates changes in the aircraft's attitude; the others (except those of direction) are rate instruments and, therefore, subject to lag. In the climb, if the speed is too high or increases too rapidly, the nose is too low; in such cases, the nose should be raised a bit on the horizon and held allowing the speed to change before making additional corrections. If the speed is too low or decreases too rapidly, the nose is too high and should be lowered a bit and held until the speed change is observed.

Airborne Procedures

In level flight, if the aircraft is climbing, the nose is too high; if descending too low. A **small** correction to the horizon should be made and **held** and the result should be observed before a further correction is made. During turns, precession errors exist in an artificial horizon and the apparent horizon (bar) changes constantly. The greatest divergence occurs after a 180-degree change of direction; if the turn is stopped here, a pitch and bank error will be observed which gradually will wash out as the gyro realigns itself with the earth. If the turn is continued, after 360 degrees, the precession error will have corrected itself and the indication will be the same as at the beginning of the turn. Constant cross checking among the horizon, altimeter, and rate-of-climb instruments, making **small** corrections to the horizon immediately when divergence from altitude is noted—these procedures will result in a smoother, more accurate, and safer job of flying with less effort on the part of the pilot.

Proper use of the horizon to control the attitude of the aircraft should produce better takeoffs, climbs, cruises, descents, approaches, and landings.

It is hopepd that these remarks will help pilots to a better understanding of jet transport flying techniques in particular and other types in general. If any important points have been overlooked or questions raised, the writer would be most grateful for your comments or inquiries.

A CASE FOR CONCRETE RUNWAYS

This plane suffered extensive damage to its landing gear when it slid off the end of an asphalt runway.

By E. R. Watson (EAL)

ALPA Region II, Air Safety Chairman

ON SEPTEMBER 13, 14 and 15, 1960, the Air Line Pilots Association held its 8th Annual Air Safety Forum in Chicago. The theme of the three day discussion on air safety was "Airport and Terminal Area Safety Problems."

In preparation for the Forum, the Air Line Pilots Association made a survey of many air carrier airports throughout the country.

One of the many industry representatives present and participating was Melvin N. Gough, Director, Bureau of Safety for the Civil Aeronautics Board. During his address to the Forum he said that if any pilot in the room slid off the end or the side of a wet slippery runway, he would send them a book to tell them why!

Facts have been obtained and are available on the advantages and disadvantages of all types of runway surfaces. Every air line pilot in the country has experienced the feeling of trying to find the ground and stopping his aircraft when breaking out of an overcast sky to face a shiny blacktop slippery runway. While the Air Line Pilots Association does not endorse any particular brand product in other areas, it has endorsed the use of concrete as a runway surface.

The Air Line Pilots Association concerns itself with all phases of operational safety. This is not difficult to understand, inasmuch as the pilots are, by law, the Federal Civil Air Regulations, responsible for the safety of the aircraft and its occupants, plus the concern for their own safety. ALPA pilot representatives participate at all levels of government and industry in safety matters.

The composition of runway surface is of vital importance to ALPA members, operationally, in three areas:

- Visibility from the air on final approach.
- Coefficient of friction after landing.
- Acceleration on take-off.

On approach and landing, pilots require a surface that will be visible and offer depth perception aid under all weather conditions. A shiny blacktop surface makes it difficult to judge height and, therefore, much distance is wasted in feeling for the ground.

Today's aircraft are indicating 135 to 150 mph on the final approach while making an instrument approach. The instrument landing system permits air line pilots to complete a landing with a ceiling as low as 200 feet and/or a visibility as low as one-half mile. Upon breaking out of an overcast and/or under low visibility conditions, pilots rely upon high intensity approach lights as guidance to the runway threshold. With all these aids, we are able to pick up the runway.

The last 200 feet altitude and one-half mile must be maneuvered with

v ual reference from the ground. What th e pilot sees ahead of him through th e cockpit window this last 200 feet o altitude and one-half mile of visibil- it will determine his decision to com- p te the landing or abandon the ap- p oach due to insufficient visual ref- e nce.

The runway surface is most impor- tant as a guide, not only in direction but, to repeat, in depth perception. A dark, wet, non-contrasting surface that blends in with the terrain presents the minimum visual aid to the pilot. A light colored contrasting surface offers the maximum visual aid.

It may be significant to add that dur- ing the certification of an aircraft by the Federal Aviation Agency, all the aircraft performance data is based on a dry concrete runway. That is, the maximum certificated performance of the aircraft is based on a dry concrete runway.

Therefore, to duplicate the perform- ance demonstrated during certification, a concrete surface is desirable. This cer- tification by the Federal Aviation Agency includes landing distances nec- essary under various gross weight con- sideration. Propeller reversing action is not considered in arriving at these dis- tances.

Once on the ground, the problem of decelerating a 150,000-pound mass from a touchdown speed of 120 mph to zero is greatly dependent upon the runway surface. I am sure much tech- nical data has been offered to support the advantages of a brushed concrete surface over other types of materials.

Tests conducted at Columbus Air Force Base, Columbus, Mississippi, in 1959 showed the many advantages of a concrete runway. The Air Force con- cluded that concrete held up better than asphalt under heavy load pres- sures, was more easily seen, provided an excellent braking surface and, in the long run, costs no more than asphalt.

Pictured above is a graphic example of deterioration of an asphalt runway.

Major General Walter W. Wilson, Deputy Engineer for Construction stated that "at the conclusion of testing, the corps of engineers had not altered their original position that primary taxiway and runway ends on heavy load air- fields should be constructed of rigid pavement concrete except in exceptional geographic areas."

General Ferry, Special Assistant of the Installation Department of the Air Force, has also indicated that concrete runways are preferable.

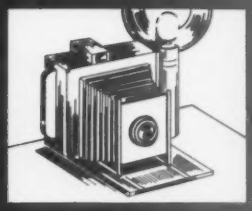
The Air Line Pilots Association has on numerous other occasions, before many groups and in the press, support- ed the need for brushed concrete surfaces. As a matter of fact, the found- er and long time President of ALPA, Mr. David L. Behncke, in January of 1944 listed as one of eleven points for future airport planning the following: "That all runways shall be light colored rough surface concrete capable of sup- porting aircraft weighing a minimum of 250,000 pounds gross under all condi- tions of speed and load."

Acceleration on take-off is important in that safety dictates that at one de- termined speed, depending upon weight, if an engine should fail the air- craft can accelerate to a safe take-off speed or abandon take-off and be brought to a safe stop. This is an im- portant consideration in the certifica- tion of the aircraft and, once again, is based on dry concrete runways. Un- even soft surfaces detract considerably from the ability of the aircraft to meet certification performance.

Because of the factors outlined here, plus the extensive operational experi- ence with both types of runways, it seems evident that all new runway pavement should be concrete because concrete does the job better, and more safely.

The importance of adequate run- ways cannot be overstressed and of ne- cessity should be the prime considera- tion in airport planning.

This aerial view shows the contrast between concrete and asphalt runways.



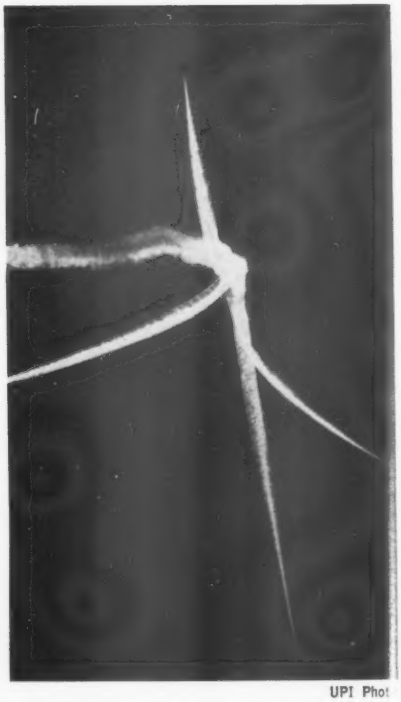
The ALPA Camera

Some Highlights and Sidelights of the News and ALPA in Pictures

Vertol Photo

Shown here is ALPA's steep gradient committee during evaluation of Vertol's turbine powered helicopter.

Ethiopian representative takes the controls of a Boeing 707 jet transport.

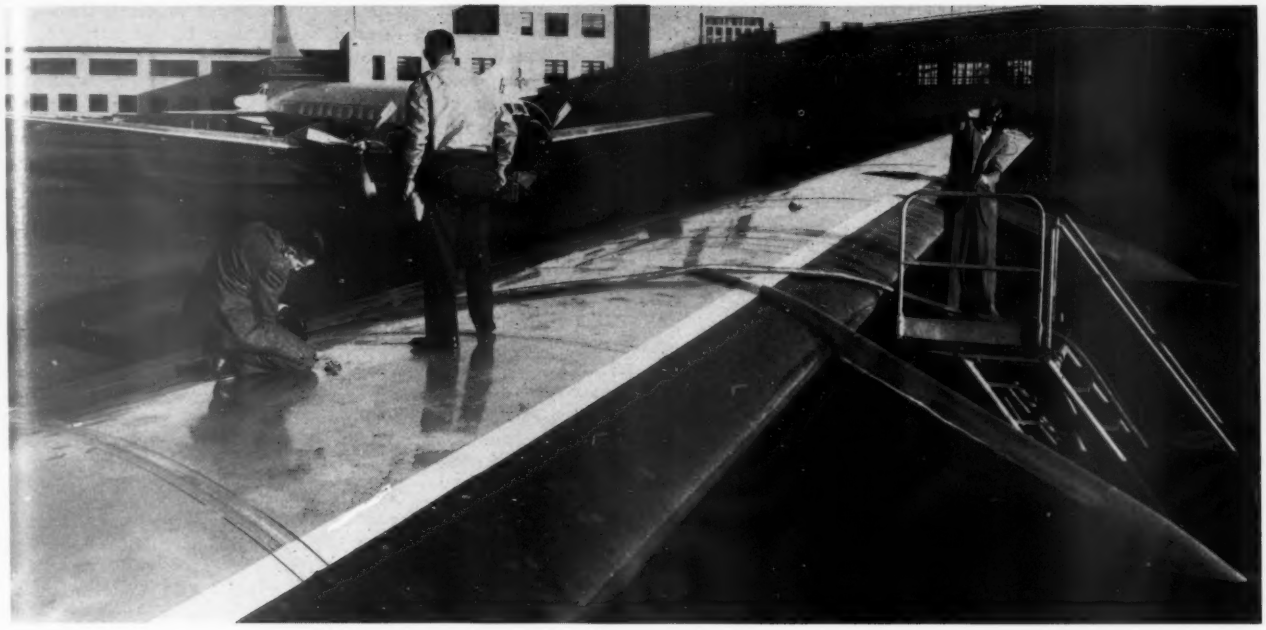


UPI Photo

Jet fighters tie an aerial knot.

UPI Photo

Wreckage of EAL Electra is raised from Boston harbor.



Air transportation— A 1960 Perspective

By Arthur D. Lewis

President, Hawaiian Airlines, Inc.

Mr. Arthur D. Lewis' first introduction to aviation came in 1941 when he joined American Airlines' Research Department as a Cargo-Research Analyst. During the Second World War, he served as an Analyst in the Policy Planning Division Headquarters of the Air Transport Command. Following the war, he returned to American Airlines in its Economic Planning Division and served in successive capacities until May, 1954, when he was promoted to Assistant Vice-President, Planning, of American Airlines.

During the Korean War, Mr. Lewis contributed to that war effort as consultant on Airlines Mobilization to the Transport Division, National Security Resources Board. He was also a Consultant to the Defense Air Transport Administration from 1951-1955. Mr. Lewis was elected President of Hawaiian Airlines in February, 1955.

I HAVE been asked to assess the present economic situation of the industry, trace some of its causes, make a few suggestions as to courses which might be followed, and make some comment about the future prospects of the domestic trunk line industry.

I have watched the problems of the industry develop both from my former position in charge of planning for one of the major carriers of the country and from my present job as Chief Executive Officer of one of the smaller carriers. And it is interesting to see the different dimensions of the same problem from an exactly opposite position far below.

During the first five months of 1960, the trunk line industry experienced a distressing loss of about $18 million. This is in contrast to 1959 when a profit of about $35,00,000 was earned during the same period. In 1959 only two carriers lost money during this period. This year six carriers lost money. The current sharp deterioration of earnings actually began in the fourth quarter of 1959 when the industry developed an operating profit of only $274,000 as compared to a profit of $34,395,000 on the fourth quarter of 1958.

Now this is a pretty sharp deterioration of earnings from a level that was not too high to begin with and warrants some attention being paid to it.

No Major Surgery Needed

First, though, let me make it clear that, in my opinion, the industry does not have cancer requiring major surgery, with the patient's life in doubt.

There are individual companies who perhaps are in the terminal stages of an illness, but that is not true of the industry as a whole. For the industry as a whole there is no serious problem which is not essentially transitional in nature or essentially superficial, with the appropriate solution being the determiniation of the appropriate fare level.

And a fare increase of about 5 per cent was allowed the industry on July 1. Whether this increase will be sufficient to bring profits up in healthy companies to a reasonable level in fiscal 1961 remains to be seen. The Civil Aeronautics Board has estimated that the 5 per cent fare increase would have raised industry revenues $84,000,000 in 1959. This figure would, of course, be increased by market growth in 1960 and 1961.

I do not propose to make a forecast of industry profit, but I should like to comment on some aspects of the industry which affect that profit.

In this connection, I should like to suggest that we distinguish between those problems which are basically industry-wide in scope and those that more specifically plague individual companies. By and large there has been a tendency to confuse the problems of one or two carriers with those of the industry or those of a specific class of carriers. Until we stop judging the entire industry by reference to the misadventures of one or two specific carriers, we will not be able to correctly appraise the basic strength of the industry. And this is true whether the problems which bedevil these companies are those peculiarly of management or result from the certification of too much competition, or both.

Existing Problems

First, there is no question but that the general cost of doing business is up sharply. The more important causes of this are: Airway congestion; intensification of employee training, particularly of flight and mechanic personnel; and the growing complication in reservation and ramp activities with the greatly increased volume of traffic. And, as referred to later in greater detail, there has been a significant upgrading of the quality of air line services which has substantially increased costs. Some of this upgrading has been in basic quality of service and some has been in frill items.

Second. We are going through one of the greatest transition periods any industry has ever been called on to go through, and there are biting inefficiencies during a period of this sort. They run the gamut from mistakes at high policy levels to mistakes by inexperienced personnel on the line. There is a learning curve in executive decision as well as at the technical level. There are unavoidable inefficiencies of equipment and service overlap. And trouble develops from the renewed jockeying for competitive position with the new equipment. It takes time for these things to shake down.

One of the obvious inefficiencies is the excessive seat miles produced by the industry over this last winter period. Normally there is a substantial seasonal cut-back in capacity. However, this last winter, seat miles for the industry remained at last summer's level. Since traffic volume followed essentially a normal seasonal pattern, substantial over-production of capacity resulted. I think that such over-production of seat miles was an inevitable part of the transition period and temporary in nature. There are already indications of adjustment in scheduling to prevent this excess capacity from continuing.

And this transition period has been further complicated by a spate of dramatic accidents, the temporary slowing up of one or two aircraft for short periods of time and a very hard winter.

In evaluating the difficulties of this transition, one must take into consideration its scope and intensity and what the industry can look forward to after the transition is made. There is no need to dwell here on its scope. That has been pointed out by all industry observers. But I think some of us have forgotten just how truly revolutionary the jet era is and what its impact will be on the total economy of this country. I think the jet era is a technical change of such magnitude that it will maintain the basic forward thrust of the air line industry for years to come. The long-range traffic forecast for the domestic air transportation industry is excellent and there is little doubt in my mind that traffic growth will carry us out of our transitional problem. For many in this industry the real opportunity for growth is just now at hand and is dynamic in the extreme. Of course, just as in all other fields, some companies will let opportunity overwhelm them. But this will not be the norm. The product improvement is revolutionary and the use which will be made of that product is enormous.

History Repeats

This is not the first time the industry has gone through a transition period. The industry faced graver problems of survival in 1947, 1948 and 1949 with the introduction of the DC-6 and Constellation equipment coming on top of a transition from a war-time economy to a peace-time economy. This period was complicated by the grounding of the DC-6 and the Constellation, coupled with rapidly rising cost level. Even at that time there were cries that the ills of the industry were not transitory in nature but were the result of too much competition certificated by the Board.

In 1947 and 1948 numerous statements appeared in the aviation and financial press such as:

"The problem of too much competition is one the CAB alone can remedy and must remedy if the industry is to be kept from bankruptcy."

Yet despite all these forecasts of bankruptcy, the transition period was accomplished in good order, the air lines developed a greater knowledge about managing their businesses than they had before, traffic continued to grow at strong annual rates, management learned to use the bigger, faster equipment effectively and the industry moved into a period of improved profits.

And that leads us into one of the really controversial questions in the industry centered around the degree of competition which has been certificated by the Civil Aeronautics Board as well as the value of the role of the regional carrier. As you may know, at the time the CAB was established in 1938 there were 17 domestic grandfather carriers. There were four large carriers at that time which carried 84 per cent of the business, and had 61 per cent of the total grandfather route mileage. At that time routes were essentially non-competitive. The Board has since developed the policy of encouraging competition and has set about strengthening the smaller carrier in the process. This, of course, has meant that the smaller carriers have received the bulk of the route awards.

Board Policy Sound

I think the Board's policy of strengthening the smaller carriers has been a good one. First, it has given the smaller carriers a greater opportunity for profit and by increasing their size has put them in a position to use modern jet equipment. Second, it has given the Board an opportunity to tailor the air line system to one which will most effectively meet the needs of the various markets served by the industry.

Some will undoubtedly argue that the Board has not increased the profitability of the smaller carriers by extend-

ing their routes into highly competitive markets, since two or three of the smaller carriers appear to be in really bad shape. But, I do not think all the troubles of these carriers can be laid at the door of their expanded routes. Some of these carriers are in trouble in spite of improved route opportunities. In more than one case, it would appear that management must take the primary blame. Other smaller carriers have improved their comparative operations substantially during the same period. Let's take a look at some of the recent facts.

In November, 1955, the Board reiterated its long-standing policy of strengthening the smaller carriers and stated in the Southwest-Northeast Service Case decision:

"It is vital in our opinion to . . . decrease . . . the gap between the relative size of the Big 4 carriers and the smaller trunks."

In that case and in others subsequent to it the Board implemented the policy by extensively certificating smaller trunk lines into markets served by the Big Four. Twenty-three of the primary revenue producing markets were added to smaller trunk systems and since they were authorized in 1955 and 1956, a reasonably good measure of the competitive impact on the Big Four can be made by comparing the 1958 traffic retained by the Big Four with the traffic they carried in 1955. In 1955, the Big Four carried 3,200,000 passengers in these markets and the smaller trunks carried 650,000. By 1958, the Big Four had dropped 4½ per cent while the smaller trunks increased their traffic in these markets by 160 per cent. It is clear from these facts that the Board's objective trafficwise is being accomplished and the noteworthy related fact is that the smaller trunk lines captured their traffic from the growth in the market rather than by diversion from the Big Four. Since 1955, the Big Four participation in revenue passenger miles has dropped from 74.1 per cent to 69.2 per cent in 1959. The participation by the smaller trunk carriers has increased from 22.9 per cent to 30.8 per cent.

Despite the redistribution of traffic as between the Big Four and the smaller air lines on a number of major segments mentioned above, the traffic of the Big Four carriers has increased from 14.33 billion revenue passenger miles in 1955 to 19.45 billion revenue passenger miles in 1959, or 36 per cent. During the same period the total revenue passenger miles of the remaining eight air lines has increased from 4.89 billion to 8.67 billion, or 77 per cent.

To determine whether the Board has strengthened these carriers financially in relation to the Big Four, we should compare the operating profits of these companies today with that of 1955. And it would seem that the key comparison for this test would be the per cent that the smaller carrier profits are today of the Big Four profits as compared to 1955. Of course, three carriers have not done well. But of the other five who had an opportunity and made the best of it, the following comparison is of interest. In 1955 Braniff's operating profit was 4.1 per cent of that of the total for the Big Four. In the year ended March 31, 1960, it had risen to 5.1 per cent. The comparable figure for Continental is an increase from 1 per cent to 8.1 per cent; for Northwest an increase from 4.9 per cent to 8.1 per cent; and Western tops them all with an operating profit of 4.7 per cent of Big Four operating profits in 1955, as compared to a whopping 19.4 per cent in the year ended March 31, 1960.

This, therefore, would indicate that the Board's policy has been successful at least as far as these carriers are concerned.

Now getting back to the second basic reason I gave for expanding the smaller carriers—by so doing, the Board has been able to evolve a policy of industry development which is highly effective and responsive to the public need. The policy that I refer to is that of creating a three-tiered layer of carrier responsibility basically nationwide in scope. Supplementing these carriers, the Board first started with the larger transcontinental trunk carriers with an interregional responsibility basically nationwide in scope. Supplementing these carriers, the Board has authorized and encouraged the development of carriers whose route structures are regional in nature. Then, to meet the remaining local needs, the Board has created a system of local service carriers.

The Board has done this for basically two reasons. With good business sense, the larger carriers will concentrate their attention on the highly competitive and most lucrative long-haul markets. With this preoccupation, the markets for an intermediate distance and lower traffic density tend to suffer comparatively from lack of attention. The only way the Board can guarantee unquestioned attention to the needs of these shorter and less dense routes is to create the regional carrier who will look on these routes of secondary importance as its real market of opportunity, and this the regional carrier does with a vigor. This not only guarantees good service by the regional carrier itself, but serves to stimulate the larger carrier into allocating more time, effort and equipment to these markets. As a result, the tone and quality of service on routes of shorter, less dense traffic approaches the basic quality of that which exists on the longer routes of national interest.

Then, there is the third area of responsibility best performed by the local service carrier, and for the same basic reasons. They offer the degree of specialization and management attention which will result in good service to the very small cities.

Role Of Regional Carrier

There is a certain glamor attached to big carrier operation which results in a tendency for the spokesmen from the industry to come from the larger carriers. As a result there has been an inadequate statement of the role which is played by the regional carrier. As a result the contribution of these carriers to the welfare of the cities they serve is undervalued.

So, too, for the same reason do we tend to lose sight of the values of competition to the general public. We tend to get the big carrier's viewpoint, which of course varies directly with whose ox is being gored at the moment. Of course, virtually nothing in this world is constructed so that to all men it is an unalloyed blessing. Certainly competition would not be one of them, but its evils are not as serious as some would indicate. If you go back into the history of this business since World War II, almost every period of low earnings in the industry has been blamed on excessive competition and the Board policy of strengthening the smaller carriers. Today is no exception, and while there are elements of truth in the argument, while there are certain routes which are too competitive, the basic problem facing the industry today simply is not overcertification of competition.

It is possible to speculate that if no new routes had been awarded in the last twelve years, the Big Four segment of the industry would be better off since it would have more traffic. However, I do not think you could convince the presidents of the smaller trunk lines that their companies and the public they serve would also be better off, financially, trafficwise and servicewise. In fact, it has been the Board's policy of strengthening the smaller carrier which prepared most of them for survival in a jet era. Without this strengthening, many of the present regional trunks would not be able to enter the new era. Not only would

they as a group be suffering more today but the vital regional service they supply would be impaired. Public service would suffer.

The basic fact of the matter is that the certification policy of the Board has been grounded in the public interest, and the public interest is always something which may be contrary to the specific interests of a specific carrier. This, of course, can bring about sharp controversy.

Route Structures Sensible

By and large I think the Board has done a good job in its development of the route structure of the industry. Basic concepts and goals concerning certification of new routes are good, and have tended to promote stability. There have been some mistakes, of course. It would require supernatural capacity for the Board to make as many route decisions in the last 22 years as it has without making some mistakes. Board members are no more omniscient than is management. I think you must give them credit for evolving a sensible program even though the pulling, tugging and verbal rumbles accompanying their deliberation would confuse even those with divine guidance.

So the issue develops—what do we do with an industry with a margin of profit which is too low for good business sense, when we cannot really blame the condition on too much competition?

I think the most important single factor adversely affecting industry earnings is the lack of flexibility in the determination of the proper fare level. As a result, over a period of years the air lines have been caught in a cost price squeeze which has been painful and deliberating. At a time of great financing requirement, rate increases have been permitted long after the need was apparent and generally long after vigorous public debate had impaired investor confidence in the industry. In 1952 the trunk lines made a profit margin of 7% of sales. In the next three years it leveled off at 5½% of sales, then dropped to 4.6% in 1956, 1.9% in 1957, 3.0% in 1958, and 3.3% last year.

Part of the reason for the delays has been the apparent differences in philosophies and viewpoints between the Civil Aeronautics Board on the one hand and the air lines on the other. The Civil Aeronautics Board would like to see the air transportation system develop with the lowest possible cost and fare levels. At the same time, virtually every industry leader I know is also anxious to keep fares low and to maximize the development of the business. A greater understanding of the matter would be reached if it were realized that there is no basic difference in desire on the part of industry leaders and the Board on this goal.

Services And Price

The problem develops and the apparent inconsistency in aims arises from the normal workings of competitive forces in the industry. In the strong intercarrier competition which exists today, industry leaders are faced with the fact that in our one-half trillion dollar economy, the majority of present air line customers are just as concerned about services as they are about price. And in today's market each carrier must stay competitive on service features, or for want of a few dollars of expenditures finds its market diminishing. The product has been continuously upgraded. Now this is comparable to the upgrading that is occurring in other competitive business throughout all industry, but there is one major difference in net operating results. In other businesses price changes responsive to cost changes cover the costs of upgrading. However, in the air line business there has been a tendency for such cost increases to come directly out of net profit of the industry.

Let me give some examples of the trend I have just mentioned.

The quality of food service has significantly improved in recent years on the longer flights, and beginning in the mid-fifties a liquor service at no charge became the vogue. There has been a general spread throughout the industry of specialized high quality services under various trade names such as "Red Carpet," "Mercury," "Imperial" and the like. And too, there has been a spread of air line clubs at airports or lounge rooms. Perhaps you would label these things as well as other similar services as frill items. However, although they may be superficial they do lend tone to a carrier's service. As such they become important competitively. They all cost money and by and large have come right out of net profit.

When the jet airplanes were introduced, the industry not only reduced flight time by about one-third and reduced noise and vibration levels, but gave the first class passenger about 25 per cent more space than he had in the preceding piston engine airplanes. He also got a lounge. This is a very real upgrading service and the industry attempted to do it at about the same fare level.

There has been a comparable upgrading of service in the Electra. This airplane was designed to replace the DC-6 and Convair on routes of short and intermediate length. However, the airplane is considerably wider than the DC-6 and a very comfortable service can be given in a five abreast seating configuration. Rates and fares have not been adjusted for the higher seat mile costs of the low density seating arrangement. I susppect this is again a transitional phase and that ultimately the payload capacity of the Electra will be maximized so as to justify its $2,300,000 cost and it will serve routes where economic efficiency is paramount.

When coach service was first introduced it was with the principle that there would be no frills but just transportation. It would be the compact car, or perhaps equivalent to the foreign import. Today not only does the passenger get there in two-thirds the time of his original trip but he has a free meal, a hot meal, and he has other services which make it directly comparable with the first-class passenger service of ten years ago. Furthermore, one large intercontinental carrier has just introduced a lounge in coach service.

And that raises a question as to whether the lounge in today's modern airplane has sufficient value to warrant the loss of payload it entails. Of course, it is likely that as long as it is offered by any carrier every competitor will find it necessary to offer it. But it certainly is questionable as to whether as an industry we are not giving something away of significantly higher cost to the air line than of value to the first class customer.

With the great process of upgrading of service, I think the air line industry is getting into the same competitive habits indulged in by the automobile industry since World War II. Are we not adding a host of frills to our service which increase our costs substantially but which do not have an intrinsic value equal to the cost? And in doing this do we not narrow our profit margins or raise fares and frustrate growth of market?

I believe there needs to be a meeting of the minds of industry leaders and the Civil Aeronautics Board so that greater understanding exists on both sides of objectives and problems in reaching those objectives. Services offered must be brought in line with fare differentials in one way or another.

Cooperative Program Required

At this point let me hasten to add that I know of no way any one or two leaders in the industry can individually act to reverse this trend. This is one

(Continued on Page 27, Col. 1)

Shown here are Clyde I. Denham (left), Frederick Davis, ATA, and Captain Don Aageson.

Pilot, Controller Get Awards For Rescue

The job of the air line pilot takes knowledge, experience, skill and oftentimes, plain, old courage.

An example of this courage was the recent action of Captain Don Aagesen (TWA), in leading a private plane to safety. The other half of the "rescue team" was Air Traffic Controller Clyde I. Denham, recipient of the "Controller of the Year" award presented by the Air Traffic Control Association and the Air Transport Association of America.

Captain Aagesen was at the controls of a TWA non-stop flight which had just departed from Chicago's Midway Airport bound for La Guardia Field. Over the Constellation's radio came word from Denham, Air Traffic Controller in the Midway Airport tower, that a single engine private plane was in trouble over Lake Michigan, above dense clouds at 14,000 foot elevation. The plane was short of fuel, and it was also presumed the private plane's instruments for landing were faulty.

Denham worked in conjunction with Captain Aagesen in guiding the private pilot out of his predicament. Aagesen received a plaque from the ATC Association and ATA for his efforts in helping the plane to safety.

"The private plane was on top of the clouds at 14,000 feet and couldn't find a 'hole' to pop through for better visability to try for a landing," Aagesen said. "I managed to get him on radio and from our radar equipment, was able to instruct him through the clouds for an approach to Joliet Field. The only problem was to keep the private plane at a safe distance so that the 46 passengers on board our flight would not be endangered. I told him where he had to fly, and gave him altitude and course instructions while maintaining a safe flight distance."

"The entire operation took between one-hour and 30-minutes to 40 minutes," Captain Aagesen said. "None of the passengers were disturbed by the rescue operation. In fact, all aboard were anxious that we do all possible to lend assistance."

Present Rescue Trophies

Representatives of the Air Line Pilots Association and the Air Line Dispatchers Association will jointly provide trophies for the championship and next four place teams in the International Rescue Contests planned for the 13th Annual Convention of the International Rescue and First Aid Association, Nov. 3-5 in Philadelphia.

Teams representing IRFAA member units and associations from various sections of the United States and Canada will compete in the IRFAA's annual International First Aid Contest and first annual International Rescue Contest.

C. N. Sayen, ALPA President, stated: "We welcome this opportunity to join with the Air Line Dispatchers Association in saluting the services of the American and Canadian rescue and first aid squads, emergency units of every type which respond to calls for their services around the clock.

"We know that if emergency situations involving aircraft arise, these units, whether composed of volunteer or paid members, become an important segment of search and rescue facilities as well as meeting year-round calls for services to the sick and injured in their respective communities."

The Chairman, IRFAA Second Vice-President, Frederick Evans, stated: "The cooperation being given by the Air Line Pilots Association and the Air Line Dispatchers Association recognizes the readiness of trained rescue and emergency units to respond to emergencies wherever they may occur."

The workshops will feature chairmen and panelists who are widely-recognized experts in the various rescue and first aid fields. Convention sessions will be open to all persons interested in the rescue and first aid movement.

Two WAL Pilots Honored For Achievements

Two captains from Western Air Lines were in the news recently—one for piloting his 707 jetliner to a new Los Angeles-San Francisco commercial jet speed record—and the other for safely landing his crippled DC-6B.

Captain J. Thayer was at the controls of a 707 when it covered the 345-mile route between the two California cities in 46 minutes. Scheduled time is 65 minutes. During its flight, the 707 reached the speed of 600 mph. Captain Thayer said helpful tailwinds assisted in setting the new record.

Captain Norman Edson won the Denver Post's Gallery Of Fame Award for bringing his crippled airliner to a safe landing at Denver's Stapleton Airfield. Edson, 47, made a perfect emergency landing after one of the wheels fell off on take-off.

Husband And Wife Team

Walking arm-and-arm across the airport at Atlanta are Captain Jack Holcomb and his wife Jean. Delta Air Lines' recall of ten former stewardesses to meet a temporary shortage resulted in this husband-wife team working a round trip flight together from Atlanta to Orlando.

Besides Jean, three other girls now flying again are married to Delta pilots and with a little luck might share some flights with their husbands.

How do the girls like being back on duty? All agree they enjoy the excitement of combining matrimony with their old jobs—an impossibility under Delta's normal policy of employing only single girls on active flight duty.

To Operations Post

Captain Robert C. Springer has been elected to the new post of Deputy Vice-President—Operations of Eastern Air Lines. A veteran air line pilot who has held various administrative positions with Trans World Airlines over the past 25 years, he will be based in Miami, and will report directly to Captain John H. Halliburton, Eastern's Vice-President—Operations.

Executive positions which Captain Springer has held with TWA include Manager of Flying and Director of Operations for the International Division and Director of Operations for the Atlantic Region.

During 1946-1947 he headed a TWA operations team reporting directly to the Chairman of the Board, which studied and surveyed and established National Flag Airlines in Arabia, Ethiopia, Greece and Italy. In 1953 he headed a similar operations team to survey extensions of TWA's routes from the Near East to the Middle and Far East.

Laud Pilot Sound Abatement Cooperation

Another example of pilot cooperation with sound abatement efforts has been reported by the Los Angeles Sound Abatement Coordinating Committee.

One hundred LAX-based jet pilots were sent questionnaires recently by the Sound Abatement Committee office, asking for operational recommendations that might aid in curbing the sounds made by jet transports.

Replies have been received from more than two thirds of the pilots queried to date.

Enlightening Recommendations

"The information contained in the replies is now being compiled for incorporation in the Committee's first annual sound abatement report," Towers said. "It is an enlightening set of recommendations and is further proof of the jet pilot's interest in doing all possible to cooperate with our sound abatement program."

Towers pointed out that the replies have been so informative that he is seriously considering making a second digest for distribution to the Federal Aviation Agency, chief pilots, the Los Angeles Department of Airports, the Air Transport Association and other interested organizations.

"Because the replies were to be personal and in strict confidence, no pilot identification will be included in either the Committee's annual report or the supplemental digest," Towers declared.

Chuck Banfe gets a farewell kiss from a well-wisher before departing on his try for an around-the-world trip in a light plane.

Appointed Chief Pilot

Newly-appointed System Chief Pilot of Braniff International Airways is Captain George D. Cheetham. In his new position as System Chief Pilot, Captain Cheetham will direct the activities of 550 pilots who fly the air line's domestic and international routes from flight crew bases at Dallas, Miami, Kansas City, Minneapolis and Sioux City.

During the past three decades Cheetham has accumulated 21,000 hours in the air and has flown more than 50 different types of aircraft including Braniff's 707-227 Super Jets. He has been a Braniff pilot 22 years.

Named Kentucky Colonel

Captain John F. Hicks (AAL) (Standing right) has been promoted to Colonel—Kentucky Colonel that is. The veteran American Airlines' pilot was given his commission by the Commonwealth of Kentucky for his role in introducing turbine-powered Electra airliners into service at Louisville last March. He was at the controls of an Electra that carried scores of state, city and civic officials, travel agents and

press representatives on several courtesy flights over Kentucky's landmarks before regularly scheduled Louisville-New York service was inaugurated March 15. James J. Lammond (left) AAL's Chicago Vice-President, made the presentation for Kentucky Governor Bert Combs. Seated at right is Willis H. Proctor, an ex-American pilot who has retired from flight duty.

FAA Revises Application For Airmen Medical Certificates

Joint meetings between the Air Line Pilots Association and the Federal Aviation Agency have resulted in an amendment of FAA's original application for airman medical certificates eliminating the requirement that all applicants sign an authorization permitting the release of additional information about the applicant's medical history. The amendment became effective August 26.

As originally constituted, the applications contained a blanket waiver of rights provision which had the effect of requiring that all air line pilots automatically authorize the full disclosure of past medical histories to the FAA and expressly waive any rights which might preclude the disclosure of such information.

Form Too Broad

Limited distribution of the original medical form resulted in objections from ALPA that the declaration was broader than was required by the needs of the Agency, and it was recommended that authorization for the release of additional information concerning medical history be required only when a specific request is made rather than requiring that it be signed with each application.

Meetings were held between Association representatives and FAA's Civil Air Surgeon, Dr. James L. Goddard, in Washington. Dr. Goddard agreed to review ALPA's objections, and shortly thereafter notified the Association that the original application would be amended.

New Wording

Simultaneously with the amendment of the original form the FAA Administrator promulgated a procedural regulation based on the present law which reads: "If the Administrator or his authorized representative finds that additional medical history is necessary to determine whether any person who applies for or holds a medical certificate meets the physical standards therefor, such person will be requested to authorize any clinic, hospital, doctor or other person to release to the Administrator or his authorized representative any available information or records concerning such medical history. Refusal or failure to provide the requested authorization may be cause for denial, suspension, modification, or revocation of the medical certificate."

The amendment eliminates the generalities objected to by the Association and helps to assure proper medical standards for the pilot group.

ILO Studies Problems of Workers Involved in the Jet Age

Problems of workers directly involved in the jet age were highlighted at the Civil Aviation meeting of the International Labor Organization in Geneva, Switzerland, September 26 to October 7, according to the AFL-CIO News.

Worker, employer and government delegates reviewed the employment conditions of all workers in civil aviation as well as the specific problems of the hours of duty and rest periods of flight personnel.

Representing American workers in the Civil Aviation Industry were AFL-CIO spokesman C. N. Sayen, President of the Air Line Pilots Association, and Frank Heisler, Airlines Coordinator of the Machinists. C. C. Jackson, Executive Secretary of the International Federation of Air Line Pilots Association, also attended.

The Conference was the first at which the ILO has had air line government officials concerned with operations sit down with representatives of both the air lines and industry employee groups. Labor spokesmen stressed the need for such meetings because of the rapid developments now taking place in the aircraft industry which influence the daily life of both flight personnel and ground workers of all categories, making it imperative that views of these workers be taken into account in any future planning or development.

Jets And Human Factors

A currently critical problem which received close scrutiny at ILO sessions, was the impact of the new subsonic jets on employment and the human factors involved, with particular emphasis on the necessity of obtaining uniform conditions of work and pay.

Commenting on the 18-nation sessions, representatives agreed that such meetings provided an opportunity to gain an insight into the problems of the other fellow, exchange ideas and information, and work together to improve standards in the aviation industry.

Delegates also urged that governments should be prepared to put more money into ILO so that a permanent body or committee could be established to anticipate industrial problems of aviation.

ALPA President Sayen confers with another delegate during an ILO session.

100 Ton Radar Antenna

A 100-ton experimental radar antenna has been raised into position at the Federal Aviation Agency's National Aviation Facilities Experimental Center in Atlantic City, New Jersey, to make possible an early start on a research project through radar for use in air traffic control.

Radar equipment now in use provides traffic controllers with information on direction and distance. The important element of altitude will be provided by a three-sided antenna making possible 360—degree coverage with an accuracy of plus or minus 500 feet

at a distance of 50 miles according to FAA.

Known as Air Height Surveillance Radar (AHSR), the antenna system was manufactured by the W. L. Maxson Corporation of New York.

Members of the ALPA Executive Committee are shown here during joint sessions with representatives of the Mexican and Canadian Air Line Pilots Associations.

Uphold Union's Right To Enforce Solidarity

The Wisconsin Supreme Court has unanimously upheld the right of unions to enforce disciplinary action against members who cross picket lines. The Wisconsin Court declared that denial of this power would make a union "a much less effective instrument of collective bargaining."

The state's highest court voided a restraining order issued by a lower court which banned locals of the Machinists and the Auto Workers from suing to collect fines levied under the union constitutions after trial of the offending members. The restraining order had been based on a ruling of the State Labor Board that fines against members who worked during a strike constituted an unfair labor practice.

The Wisconsin Supreme Court declared: "Any attempt by the states to regulate union activity in such a way as to disrupt the balance of bargaining power between unions and employers would be an invasion of a field of regulation already pre-empted by Congress."

The Court added that "a union without power to enforce solidarity among its members when it resorts to a strike . . . is a much less effective instrument of collective bargaining than a union which possesses such power."

Rulemaking — Arabian Style!

U. S. commercial aviation faces many new problems daily as it moves forward into the jet age. Most are serious, some are comical. But heretofore our aviation system has been spared one critical problem now facing Saudi Arabian Airways.

According to a recent article in the New York Times, the mufti of Saudi Arabia has proclaimed a rule that all hostesses of the local air line must be chaperoned in flight by a father, brother or son.

Reportedly, the air line has stated that they regard the new rule as "impractical."

Simultaneous Landing Systems Tested At Chicago's O'Hare

How close can parallel runways be at major airports for safe, simultaneous and independent instrument flight operations?

The answer to this question and others is the aim of the current FAA project being conducted at Chicago's O'Hare International Airport.

A target date of early 1961 has been set for compilation of the testing results. If the results show that runways closer together can be used safely, the capacity of many present airports during instrument flying conditions could be substantially increased, according to FAA.

O'Hare Flight Testing

The FAA will use a mobile instrument landing system and a simulated runway in conjunction with the testing of one of the existing runways at O'Hare. This will permit flight testing different separation distances and will result in an optimum separation distance. In addition to determining the minimum separation distance between runways for this type of operation in general, another objective of the test is to specifically determine the suitability of the present O'Hare runway separation for simultaneous independent instrument operations in the Chicago environment. A cross-section of aircraft, including a jet-powered plane, will be used in this testing.

Parallel runways are presently being used for simultaneous landing and take-offs, but to date, simultaneous landings have not been attempted in regulated operations.

Industry Briefs

Turbine-Powered Copter

Los Angeles Airways has received their first Sikorsky S-62 single turbine helicopter. The 9-12 passenger amphibious aircraft will be the first turbine-powered helicopter in scheduled air line service. The S-62 is leased by Los Angeles Airways which has ordered five twin-turbine S-61's for 1961-1962 delivery.

Mohawk Phases Out DC's

Mohawk Airlines has announced that it is phasing out its remaining DC-3's and expects to retire its entire DC-3 fleet by the end of 1961. One has already been sold and the rest are up for sale.

Canadair Cargo Aircraft

Canadair, manufacturer of the CL-44 turboprop cargo plane, lists eight advantages of all new turbojet or turboprop cargo aircraft.

They include lower direct operating cost; no crew training problems; lower fuel consumption; smaller and less expensive aircraft; lower external noise levels; shorter field length requirements; flexibility in selection of operating altitudes and better ground environment for reduced operating costs and better service.

Riddle Buys DC-7's

Riddle Airlines recently announced that it has purchased seven Douglas DC-7's which it intends to convert to cargo-passenger configuration. Riddle plans on converting all seven aircraft by the middle of 1961. Estimated cost of the conversion: $300,000 per airplane.

The Cost of Silence!

Keeping jet engines muffled is a costly business according to Boeing Aircraft. To compensate for the thrust loss caused by its 21-tube sound suppressors, a Boeing 707-120 uses about 500 gallons of extra fuel on a coast-to-coast flight. The weight of the fuel cuts down on payload capacity. Boeing estimates that the annual cost of keeping the engines quieter is more than $1 million per plane.

CAB Safety, Public Information Appointments

George W. Haldeman has been appointed as Special Assistant to Melvin N. Gough, Director of Safety for the CAB. Haldeman will be concerned with the technical problems connected with the development of new jet and supersonic transport aircraft, and with the study of aviation accident prevention measures. He has a vast aviation background stretching over three decades including positions as a pilot, engineer and a corporation consultant. He has been a pilot for 43 years and has logged 23,000 flying hours.

The CAB also announced the appointment of Mrs. Grace M. Biermann as Chief of Public Information for the Civil Aeronautics Board.

Mrs. Biermann, a veteran of 16 years in CAB's information office, has been with the Board since January, 1939, shortly after its organization.

She was, from 1939 to 1944, in the office of the Director of CAB's Bureau of Economic Regulation, transferring to Public Information in October, 1944, where she has been assistant chief and acting chief. Her experience in transportation includes ten years with the Interstate Commerce Commission prior to the establishment of the CAB. She is a member of the Women's National Press Club, and served as treasurer of that organization in 1959.

Plane Views
A SCHEDULED AIRLINER TAKES OFF OR LANDS SOMEWHERE IN THE U. S. EVERY FIVE SECONDS.
THE JET AIRLINERS PRODUCED BY A SINGLE MANUFACTURER NOW CARRY A MILLION PASSENGERS IN LITTLE MORE THAN A MONTH.
THE AIRLINE INDUSTRY HANDLED ABOUT 80 MILLION PASSENGER RESERVATION TELEPHONE CALLS LAST YEAR.
AEROSPACE

Papers and more papers! Shown above is a pile of FAA revisions to a commercial pilots basic operating manuals. The stock of revisions was accumulated over a three month period and almost exceeds the bulk of the basic manuals.

IATA Plans Technical Conference For April 17

The International Air Transport Association has announced that it will hold the 14th Technical Conference of the IATA in Montreal beginning April 17, 1961. Captain R. V. Carleton, Vice-President of Operations, Braniff Airways, Inc., will be the Chairman.

The first week of the Conference will be devoted to an intensive international symposium examination of supersonic aircraft. More than 500 engineers, operations experts, research scientists, economists and other interested specialists from air lines, various international organizations, governments, manufacturers and laboratories from virtually all parts of the world are expected to participate.

Purpose of Conference

According to IATA Technical Director, Stanislaw Krzyczkowski, the purpose of the symposium is to develop a more clear picture of the capabilities and limitations of supersonic aircraft, discuss how it can best be adapted to transport uses, examine its needs for airports, air navigations and other facilities, and assess some of its economic implications.

Other subjects to be discussed among the air lines during the second week of the Conference will include advanced techniques in aeronautical communication systems and a review of certain meteorological problems in the light of jet operations experience.

FAA Adopts Airport Fire, Rescue Standards

The Federal Aviation Agency has adopted its first federal standards for airport fire and rescue equipment.

According to FAA, the new program will be based on an educational viewpoint and their primary step will be to encourage airports to meet the requirements laid down. FAA has not established rulemaking procedures to require compliance with their standards because of what the Agency terms the "huge initial capital outlay involved." FAA estimates run over $100 million, and Agency spokesmen add that the use of federal funds would be a drastic departure from normal procedure and would require new legislation. FAA estimates that conformance with their new standards for fire and rescue equipment would protect 90 per cent of all commercial passengers.

Industry groups agree that FAA's move was a step forward, but feel that the Federal Aviation Agency should carry the financial responsibility for providing fire and rescue gear to U. S. Airports.

Jet Economy Figures

Scandinavian Airlines System has revealed that their jets are proving to be 20-30% cheaper to operate than piston-engined aircraft. SAS figures show that the DC-8 is 30% cheaper to operate than the DC-7 on a ton-mile basis, and 20% cheaper on a seat-mile basis. The seat-mile cost on the Caravelle is 25% lower than that of piston-engined aircraft, and 20% cheaper on a ton-mile basis.

National Safety Meeting

The safety of labor, management, and the clergy, were the main topics of discussion at labor sessions of the 48th National Safety Congress annual convention of the National Safety Council held in Chicago, October 17-22.

The opening labor session, a discussion of labor-management cooperation in safety, featured C. N. Sayen, ALPA President, and John T. Atkinson, Safety Director, International Woodworkers of America, for labor, and Don Adams, Safety Coordinator, Pacific Coast Association of Pulp and Paper Manufacturers, Portland, Oregon, representing management.

The Safety Congress had 300 sessions on all forms of safety; farm, home, work, public, school, and traffic, and 900 program participants as well as hundreds of exhibits of safety devices and products.

A Fishy Story?

Everybody's heard about flying fish, but what about fish that fly seven miles high at almost 600 miles per hour?

And, ever heard of fish taking tranquilizers?

It's all true, says Pan American Airways, which has completed delivery by Jet Clipper of nearly a half-ton shipment of happily tranquilized Rhode Island striped bass to Portugal.

The bass were shipped to Portugal as a good will gift of the state of Rhode Island and will be used in an effort to spawn schools of striped bass in Portuguese waters. The bass were caught near Wickford, R. I., and kept in floating carriers for 48 hours before shipping to be sure their digestive tracts were clean.

Later, they were placed in plastic bags at a ratio of one pound of fish to a gallon of water. Oxygen and a tranquilizer were injected into the bags which were then placed in cartons.

In Portugal, the bass, still in their plastic bags, were placed in floating carriers until the temperature in the bags and that of the surrounding water were approximately the same. The fish were then released from the containers, but confined until all effects of the tranquilizer disappeared.

They were then replaced in the Atlantic, some 3,000 miles from their home waters, to spawn new generations of American-Portuguese striped bass.

P an New Aviation Hearings

The Transportation Subcommittee of th House of Representatives tentatively plans to resume its FAA and air line industry investigation at a hearing December 12, according to Chairman John B. Williams (D-Miss.).

Major problems expected to receive a big share of the Subcommittee's attention include a review of the Federal Aviation Act, jet crew training, certification of new aircraft and air line maintenance problems.

Air Transportation

(Continued from Page 20)

area where each carrier must keep up with the Jones' or lose the traffic.

If the Board could with the assistance of the industry develop some machinery for stabilizing the services to be offered at any given fare level both the industry and the public would be better off. The industry would be benefited because the services it would offer would bear a reasonable relationship to the prices it would charge, with a resulting reasonable margin of profit. The public would be paying prices reasonably related to the services received and this would result in the long run in an industry stable enough and prosperous enough to guarantee continued good service. And most important of all, industry and Board objectives regarding fares and services would develop greater compatibility. Without this, the recent fare increase of 5 per cent would become another interim increase. With compatibility there is the promise of a stabilized fare level.

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